



# **Red Hat Cloud Infrastructure 5 Quick Start for Red Hat Enterprise Linux OpenStack Platform and Red Hat CloudForms with Smart Management**

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Installing Red Hat Cloud Infrastructure

Red Hat Cloud Infrastructure Documentation Team



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## **Abstract**

This guide covers how to deploy Red Hat Cloud Infrastructure using Red Hat Enterprise Linux OpenStack Platform as the virtualization layer, CloudForms Management Engine for systems management, and Red Hat Satellite for smart management.

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## 1. Overview

The goal of the RHEL OpenStack Platform and Red Hat CloudForms installation process described in this guide is to create a solid RHEL OpenStack Platform infrastructure that is managed by Red Hat CloudForms.

Before you begin the actual RHEL OpenStack Platform and Red Hat CloudForms installation process, you need to have some of the following in place:

### Computers

The RHEL OpenStack Platform installer can be installed on a physical host or as a virtual machine on a KVM host. Likewise, controller nodes can be on physical or virtual systems. Hypervisors are generally installed directly on bare metal.

### Network Interfaces

The network connecting your RHEL OpenStack Platform installer, controller, and compute nodes should be a private network. That is because the installer runs infrastructure services (such as DHCP and DNS) that only apply to the RHEL OpenStack Platform systems. An external network is required by the installer to at least gain access to Red Hat software repositories (although that service could be provided by a Red Hat Satellite server attached to your local network). Network traffic for virtual machines within the RHEL OpenStack Platform configuration itself are directed to external networks through the controller node. Depending on workload, you might also have a separate tenant network that can handle traffic between compute nodes, such as virtual machine migration.

### Storage

Disk storage is needed by RHEL OpenStack Platform to provide back-end block storage for virtual machines (provided by the Cinder service) and operating system images (provided by the Glance service). Configuration of both of these services is available through the RHEL OpenStack Platform installer.

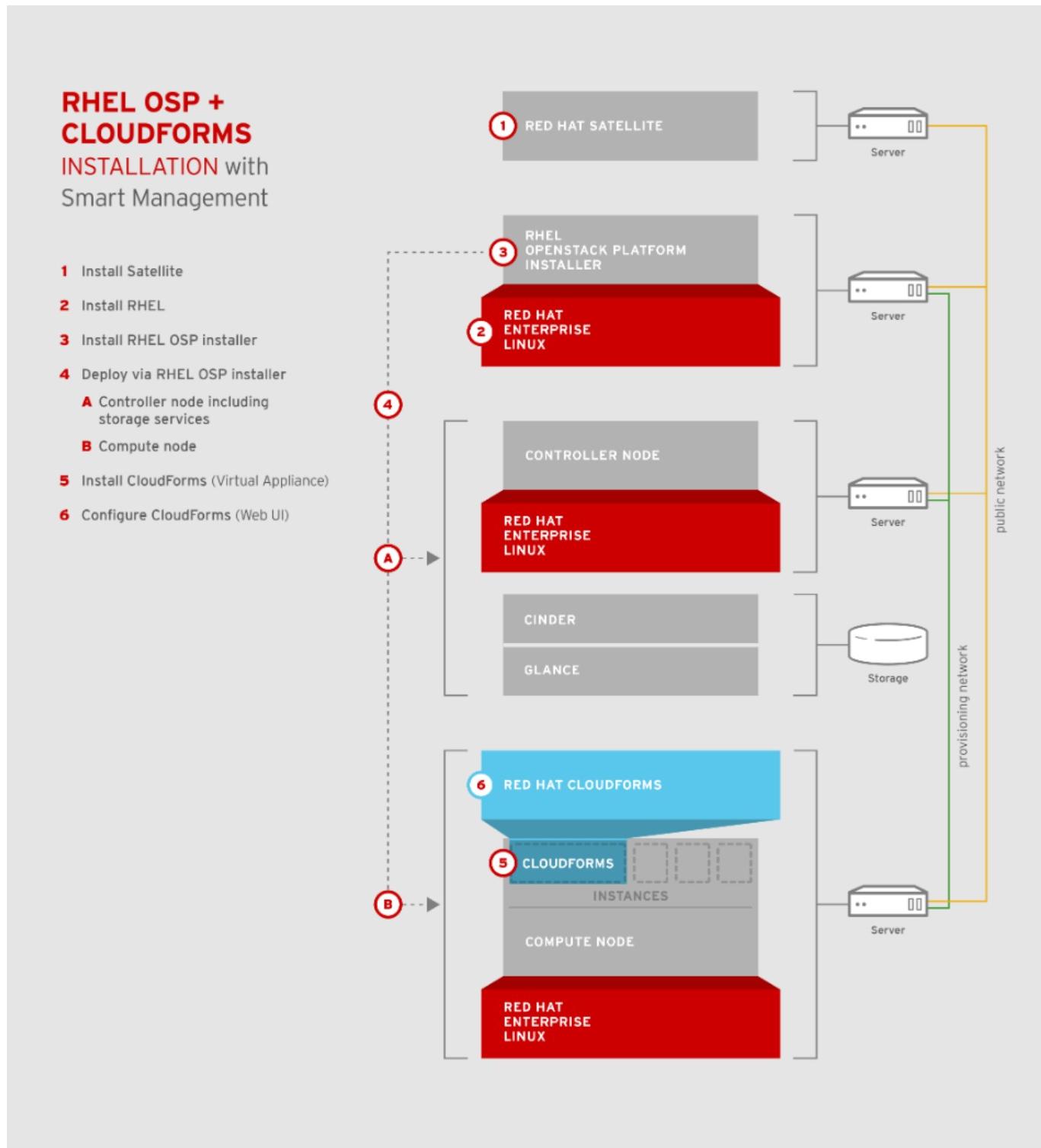
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### 1.1. Key Steps

Installation of a RHEL OpenStack Platform setup consists of the following basic steps:

1. Install Red Hat Satellite: Red Hat Satellite is a source for installing software on client systems. (*#1 in the accompanying diagram*)
2. Install Red Hat Enterprise Linux: You need to install Red Hat Enterprise Linux as a prerequisite to installing the RHEL OpenStack Platform installer software. (*#2 in the accompanying figure*)
3. Install the RHEL OpenStack installer: Install the RHEL OpenStack Platform installer software on the Red Hat Enterprise Linux system you just set up. The installer is used to deploy a controller node and a compute node in your RHEL OpenStack Platform configuration. (*#3 in the accompanying figure*)
4. Provision RHEL OpenStack Platform: Each computer in your RHEL OpenStack Platform configuration must boot from its network interface card to allow the installer to discover it. Once discovered, each computer is assigned as a compute node or a controller node. After configuring the compute and controller services, each of those nodes is installed and configured from bare metal. During configuration of your controller nodes, you also identify the location of Glance and Cinder storage. (*#4, A and B in the accompanying figure*)

5. Install Red Hat CloudForms: A Red Hat CloudForms appliance can be installed as a virtual machine on a host in the RHEL OpenStack Platform environment. (#5 in the accompanying figure)
6. Configure Red Hat CloudForms: After Red Hat CloudForms is up and running as a virtual machine on a compute node, it can then be configured to manage the assets of the RHEL OpenStack Platform environment. (#6 in the accompanying figure)



**Figure 1. Red Hat Enterprise Linux OpenStack Platform and CloudForms Installation with Smart Management**

With Red Hat CloudForms in place and communicating with the controller node, you can start using Red Hat CloudForms to manage the resources within your RHEL OpenStack Platform environment. See [Section 6, “Explore What’s Next”](#) for ways to start using your new RHEL OpenStack Platform and Red Hat CloudForms configuration.

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## 2. Installing Red Hat Satellite

Setting up a production Red Hat Satellite Server that can act as a source for installing software on client systems involves three key steps: installing the Red Hat Satellite Server on a machine running Red Hat Enterprise Linux, creating a subscription manifest that describes the software repositories the Red Hat Satellite Server provides, and synchronizing the packages in those software repositories available to the Red Hat Satellite server with those available to the Content Delivery Network. This section guides you through these steps, and results in a working Red Hat Satellite server with which to register client machines and download the packages required to install Red Hat Enterprise Linux OpenStack Platform.



### Note

This section outlines only the basic options for setting up a Red Hat Satellite Server, such as providing software using the default organization entry. For more information on advanced configuration options, see the Red Hat Satellite 6.0 [Installation Guide](#).

### 2.1. Requirements for Red Hat Satellite

The following are the requirements for installing a basic Red Hat Satellite Server:

- One physical machine on which Red Hat Enterprise Linux 6.5 or above is installed. This guide outlines how to install Red Hat Satellite Server on this machine. This machine requires the following:
  - 64-bit architecture
  - A minimum of 2 CPU cores; 4 cores are recommended.
  - A minimum of 8 GB memory; 12 GB is recommended. Use 4 GB of swap space where possible.
  - A minimum of 6 GB storage for installing the base Red Hat Enterprise Linux operating system.
  - A minimum of 400 MB storage for the Red Hat Satellite 6 software installation
  - A minimum of 120 GB storage for all Red Hat Enterprise Linux OpenStack Platform repositories.
- The details of a Customer Portal account for subscribing the machine, including the user name and password.
- A fully qualified domain name that can be resolved using forward and reverse DNS lookups.

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### 2.2. Firewall Rules

The following table outlines the firewall rules that you must manually configure before installing Red Hat Satellite Server. Satellite Server uses these ports to communicate with and control other machines in the environment. Configuration of these firewall rules is outlined in the procedure for installing Satellite Server.

**Table 1. Red Hat Satellite Server Firewall Rules**

Ports	Protocols	Service	Purpose
80, 443	TCP	HTTP, HTTPS	The Apache web server for hosting the user interface for the Red Hat Satellite Server.
5671	TCP	SSL	Secure communication with systems that the Red Hat Satellite Server manages.
8080	TCP	Tomcat6	Java connections.
8140	TCP	Puppet	Communication between Puppet clients and the Puppet master.
9090	TCP	Foreman Smart Proxy	Foreman Smart Proxy connections with systems that the Red Hat Satellite server manages.

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## 2.3. Red Hat Satellite Installation and Initial Configuration

Installing Red Hat Satellite Server involves four key steps: registering the system on which to install Satellite Server with the Content Delivery Network, configuring the required firewall rules, downloading the required packages, and installing and configuring Satellite Server.

### 2.3.1. Subscribing to the Required Channels Using Subscription Manager

To install Red Hat Satellite Server, you must register the system where you are installing the Red Hat Satellite Server with Red Hat Subscription Manager, and subscribe to the required channels.

1. Register your system with the Content Delivery Network, entering your Customer Portal user name and password when prompted:

```
# subscription-manager register
```

2. Find entitlement pools containing the channels required to install the Red Hat Satellite Server:

```
# subscription-manager list --available | grep -A8 "Red Hat Enterprise Linux Server"
# subscription-manager list --available | grep -A8 "Red Hat Enterprise Linux Software Collections"
# subscription-manager list --available | grep -A8 "Red Hat Satellite"
```

3. Use the pool identifiers located in the previous step to attach the **Red Hat Enterprise Linux Server**, **Red Hat Enterprise Linux Software Collections**, and **Red Hat Satellite** entitlements to the system:

```
# subscription-manager attach --pool=pool_id
```

4. Enable the required channels:

```
# subscription-manager repos --enable rhel-6-server-rpms
# subscription-manager repos --enable rhel-server-rhscl-6-rpms
# subscription-manager repos --enable rhel-6-server-satellite-6.0-
rpms
```

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### 2.3.2. Installing and Configuring Red Hat Satellite

Install the packages and dependencies required to run the Red Hat Satellite Server. Satellite Server has an automatic initial configuration script that prepares the Satellite Server for use.

1. Install the *katello* package:

```
# yum install katello
```

2. Configure the required firewall rules:

```
# iptables -I INPUT -m state --state NEW -p tcp --dport 443 -j
ACCEPT \
&& iptables -I INPUT -m state --state NEW -p tcp --dport 5671 -j
ACCEPT \
&& iptables -I INPUT -m state --state NEW -p tcp --dport 80 -j
ACCEPT \
&& iptables -I INPUT -m state --state NEW -p tcp --dport 8140 -j
ACCEPT \
&& iptables -I INPUT -m state --state NEW -p tcp --dport 9090 -j
ACCEPT \
&& iptables -I INPUT -m state --state NEW -p tcp --dport 8080 -j
ACCEPT \
# iptables-save > /etc/sysconfig/iptables
```

3. Configure Red Hat Satellite Server:

```
# katello-installer
```

4. Configure the firewall to limit **elasticsearch** to **foreman** and **katello** system users and make these rules persistent during reboots:

```
# iptables -A OUTPUT -o lo -p tcp -m tcp --dport 9200 -m owner --
uid-owner foreman -j ACCEPT \
&& iptables -A OUTPUT -o lo -p tcp -m tcp --dport 9200 -m owner --
uid-owner katello -j ACCEPT \
&& iptables -A OUTPUT -o lo -p tcp -m tcp --dport 9200 -m owner --
uid-owner root -j ACCEPT \
&& iptables -A OUTPUT -o lo -p tcp -m tcp --dport 9200 -j DROP
# iptables-save > /etc/sysconfig/iptables
```

The Red Hat Satellite Server is populated with an initial organization and location named "Default Organization" and "Default Location", respectively.

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### 2.3.3. Connecting to the Red Hat Satellite User Interface

When you install the Red Hat Satellite Server, a default administrative user account is created with the username **admin** and the password **changeme**. The first time you log in to the user interface, you must use this account. Moreover, it is strongly recommended that you immediately change the password for this account to secure access to the user interface.

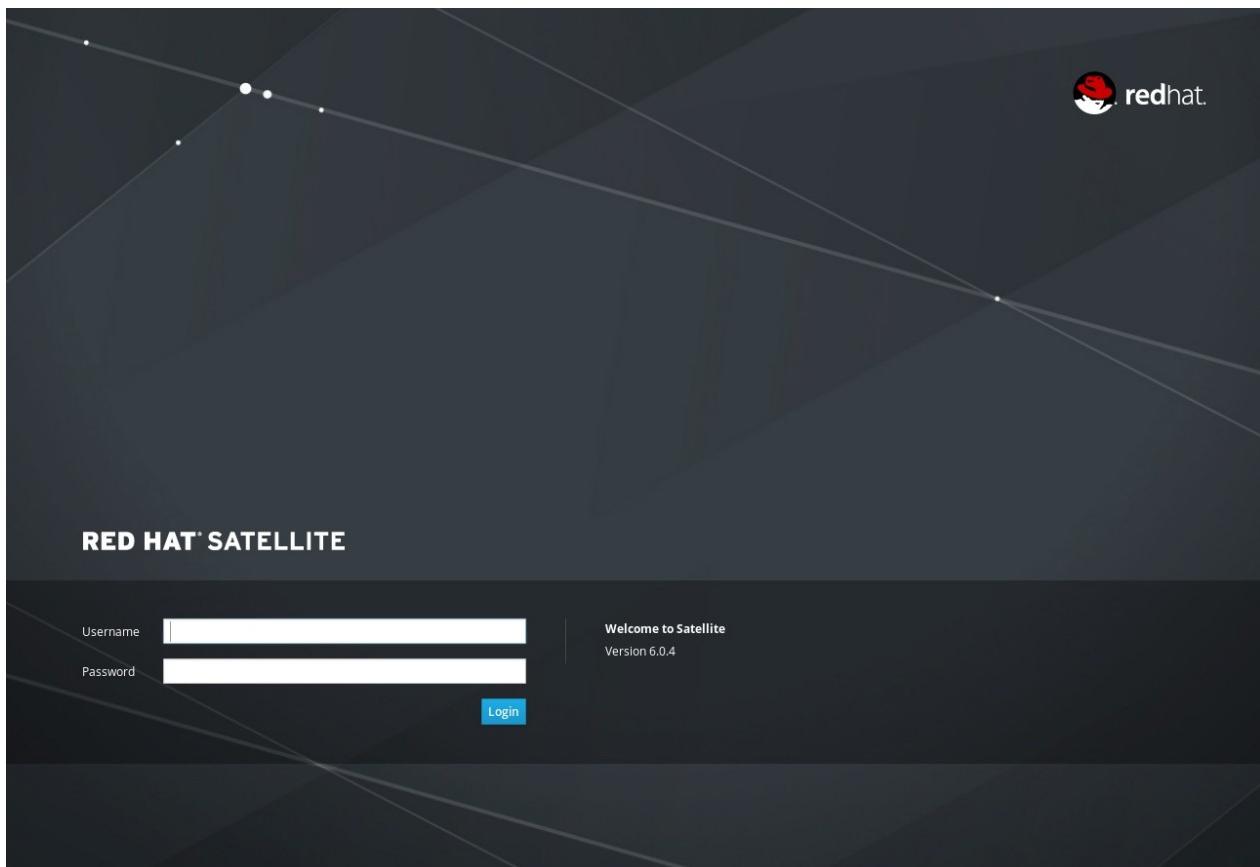
1. In a web browser, navigate to **https://your-satellite-fqdn**, replacing *your-satellite-fqdn* with the fully qualified domain name that you provided during installation.



### Important

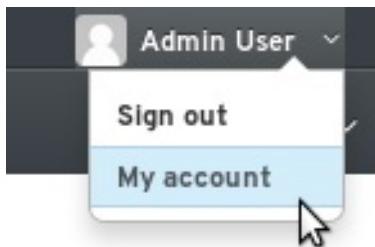
The first time that you connect to the user interface, you are prompted to trust the certificate being used to secure communications between your browser and the web server. You must accept this certificate.

2. Enter **admin** in the **User Name** field and **changeme** in the **Password** field.



**Figure 2. The Red Hat Satellite Server login screen**

3. Click **Login**.
4. In the user interface, click **Admin User** → **My account** in the upper right of the title bar to open the **Edit User** window.



**Figure 3. Accessing account settings**

5. Enter a new password in the **Password** text field and again in the **Verify** text field.
6. Click **Submit**.

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## 2.4. Populating Red Hat Satellite with Content

Red Hat Satellite Server provides software updates to subscribed client systems. In order for Red Hat Satellite Server to provide software updates to client systems, it requires setting up a manifest from the Red Hat content provider, enabling the necessary Red Hat repositories, and synchronizing the content to the Satellite Server.

### 2.4.1. Setting up a Manifest

Obtain a subscription manifest and upload it to your organization.

1. Go to <https://access.redhat.com>, and log in to the Red Hat Customer Portal using your customer account details.
2. Click **Subscriptions** → **Subscription Management** → **Subscription Management Applications**, and then click **Satellite**.
3. On the upper right corner of the Subscriptions Management Applications page, click **Register a Satellite**.
4. Create a name for your Red Hat Satellite Server.
5. Select **Satellite 6.0** from the **Satellite version** list.
6. Click **Register**.
7. Click **Attach a subscription**, and add the subscriptions required for Red Hat Satellite Server:
  - a. Red Hat Enterprise Linux 6 Server x86\_64
  - b. Red Hat OpenStack for Red Hat Enterprise Linux 6 Server x86\_64
  - c. Red Hat Software Collections for Red Hat Enterprise Linux 6 Server x86\_64
  - d. Red Hat Common x86\_64 for Red Hat Enterprise Linux 6 Server x86\_64
  - e. Red Hat Satellite Server 6 x86\_64
8. Click **Attach Selected**.

9. Click **Download manifest** to generate an archive in .zip format that contains the manifest for Red Hat Satellite Server.
10. Log in to the Red Hat Satellite Server.
11. Click **Any Context → Any Organization**, and select the default organization.
12. Click **Content → Red Hat Subscriptions**, and then click **Manage Manifest** on the upper right corner of the page.
13. In the **Subscription Manifest** section, click **Actions**, and under the **Upload New Manifest** subsection, click **Browse**.
14. Select the manifest file to upload, and then click **Upload**.

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#### 2.4.2. Enabling the Required Repositories

In the Red Hat Satellite Server, enable the repositories required to install Red Hat Enterprise Linux OpenStack Platform, and prepare them for synchronization..

1. From the Red Hat Satellite Server user interface, click **Content → Red Hat Repositories**.
2. Click the **RPMs** tab.
3. Click the arrow next to **Red Hat Enterprise Linux OpenStack Platform** to expand the list of available repository sets.
4. Choose the following repository sets to automatically enable them:
  - a. Red Hat Enterprise Linux 6 Server x86\_64
  - b. Red Hat OpenStack for Red Hat Enterprise Linux 6 Server x86\_64
  - c. Red Hat Software Collections for Red Hat Enterprise Linux 6 Server x86\_64
  - d. Red Hat Common x86\_64 for Red Hat Enterprise Linux 6 Server x86\_64
  - e. Red Hat Satellite Server 6 x86\_64

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#### 2.4.3. Synchronizing Content from Source Repositories to Red Hat Satellite

Synchronization is the act of coordinating updates between the Red Hat Satellite Server repositories and the source repositories being used. It is a required step after enabling repositories to populate the Satellite Server with content from the source repositories.

Constant, scheduled synchronization provides the following benefits:

- » Data integrity between packages
- » Updated packages, security fixes, and errata

Satellite Server's synchronization management capabilities allow organization administrators to create synchronization plans to configure how often a host should look for and install updates. Synchronization plans are then paired with the product repositories to come up with a synchronization schedule that will allow products to be updated at specific intervals that are convenient for the organization's network.

### 2.4.3.1. Synchronizing the Repositories

After enabling the required repositories, you must manually synchronize them. Then, the local repository in the Red Hat Satellite Server is populated by the required packages.

1. From the Red Hat Satellite Server user interface, click **Content** → **Sync Status**.
2. Click the arrow next to **Red Hat Enterprise Linux OpenStack Platform** to see available content.
3. Select the enabled repositories.
4. Click **Synchronize Now**.

The status of the synchronization process appears in the **Result** column. If synchronization is successful, **Sync complete** appears; if it fails, **Error syncing** appears.

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### 2.4.3.2. Creating a Synchronization Plan

Create a synchronization plan to ensure regular, frequent synchronization of source repositories to the Red Hat Satellite Server.

1. From the Red Hat Satellite Server user interface, click **Content** → **Sync Plans**.
2. Click **New Sync Plan**.
3. Enter a **Name** and **Description** for the plan.
4. Select **daily** from the **Interval** list.
5. Accept the default values for **Start Date** and **Start Time**.
6. Click **Save**.

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### 2.4.3.3. Applying a Synchronization Schedule

Associate Red Hat Enterprise Linux OpenStack Platform with your synchronization plan to create a synchronization schedule.

1. From the Red Hat Satellite Server user interface, click **Content** → **Sync Plans** and select the newly created synchronization plan.
2. Click the **Products** tab, and then click **Add** in the **Product Management** section.
3. Select the **Red Hat Enterprise Linux OpenStack Platform** check box.
4. Click **Add Selected**.

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## 3. Installing Red Hat Enterprise Linux OpenStack Platform

Setting up a production Red Hat Enterprise Linux OpenStack Platform environment involves provisioning that environment using the Red Hat Enterprise Linux OpenStack Platform installer. The installer is a graphical user interface that provides functions for managing the provisioning of Red Hat Enterprise Linux OpenStack Platform components on a set of physical machines.

There are three key steps to the provisioning process: installing the user interface for the Red Hat Enterprise Linux OpenStack Platform installer, adding hosts to the user interface onto which to provision the environment, and then provisioning the environment. This section guides you through these steps, and results in a basic working environment with one controller node, which provides the core services for administering the environment, and one compute node, which acts as a hypervisor that provides the processing capabilities for running the environment.

### Note

This section outlines only the basic options for provisioning Red Hat Enterprise Linux OpenStack Platform, such as using LVM as the volume driver for block storage, no high availability, and a networking service integrated into the compute node itself known as Nova networking. For more information on advanced configuration options, see [Deploying OpenStack: Enterprise Environments \(Red Hat Enterprise Linux OpenStack Platform Installer\)](#)

## 3.1. Requirements for Red Hat Enterprise Linux OpenStack Platform

The following are the requirements for provisioning a basic RHEL OpenStack Platform environment using the installer:

- » A private network accessible by physical machines on which RHEL OpenStack Platform components can be provisioned. Services such as DHCP, DNS, and PXE must be disabled on this network because these services can interfere with the installer.
- » One physical machine running Red Hat Enterprise Linux 6.6 on which to set up the installer. For this machine, 6 GB of memory is recommended; a minimum of 4 GB memory is required.



### Important

The machine on which you set up the installer must have a fully qualified domain name that satisfies the following requirements:

- Matches the domain of the network to be provisioned.
- Does not conflict with any existing domains (to prevent resource conflicts).

- » A machine that is a member of the private network and that also has access to external networks that can act as a router or gateway. The machine on which the user interface is installed can perform this function if required.
- » Two physical machines to act as nodes in the environment. These machines must be members of the private network, but no other prior configuration is required.
- » A Red Hat Enterprise Linux 7.0 installation medium. An installation medium is a source of files that the installer can use to install the base operating system on a machine when you provision RHEL OpenStack Platform. The installation medium must be in the format of an operating system installation tree that is accessible to the machine on which to set up the installer via a web server or an NFS share.
- » The details of a Customer Portal account for subscribing the machine on which to set up the user interface for the installer, and for registering the hosts in your RHEL OpenStack Platform environment, including the user name, password, the ID of an entitlement pool to attach, the names of channels to enable, and the details of a HTTP proxy, if any.

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## 3.2. Firewall Rules

The following table outlines the firewall rules that the **rhel-osp-installer** command configures when you install the user interface. The installer uses these ports to communicate with and control other machines in the environment. This table is provided for your information; no further configuration is necessary beyond that provided by **rhel-osp-installer**.

**Table 2. Red Hat Enterprise Linux OpenStack Platform Installer Firewall Rules**

Ports	Protocols	Service	Purpose
22	TCP	SSH	Connecting to other machines on the private network that the installer defines.
53	TCP, UDP	DNS	Resolving the host names and addresses of machines on the private network that the installer defines.
67	TCP	DHCP	Assigning IP addresses to machines on the private network that the installer defines.
69	TCP	TFTP	Enabling the PXE booting of machines on the private network that the installer defines.
80, 443	TCP	HTTP, HTTPS	The Apache web server for hosting the user interface for the installer.
8140	TCP	Puppet	Communication between Puppet clients and the Puppet master.

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## 3.3. Installing the Red Hat Enterprise Linux OpenStack Platform Installer User Interface

Installing the user interface involves four key steps: registering the system on which to install the user interface with the Content Delivery Network, preparing an initial installation medium for provisioning your RHEL OpenStack Platform environment, downloading the required packages for the user interface, and installing and configuring the user interface.

### 3.3.1. Subscribing to the Required Channels Using Subscription Manager

To install the RHEL OpenStack Platform installer user interface, you must register the system where the user interface will be installed with your Red Hat Satellite server and subscribe to the required channels. You must also install the Katello agent to allow your Red Hat Satellite server to provide information about errata that are applicable for the system.

1. Download and install a copy of the CA Certificate for your Red Hat Satellite server:

```
yum -y --nogpgcheck install http://[hostname]/pub/katello-ca-consumer-[hostname]-1.0-1.noarch.rpm
```

2. Register your system with your Red Hat Satellite server, entering your Customer Portal user name and password when prompted:

```
# subscription-manager register --org=Default_Organization --environment=Library
```

- Find entitlement pools containing the channels required to install the Red Hat Enterprise Linux OpenStack Platform Installer:

```
# subscription-manager list --available | grep -A8 "Red Hat Enterprise Linux Server"
# subscription-manager list --available | grep -A8 "Red Hat Enterprise Linux OpenStack Platform"
# subscription-manager list --available | grep -A8 "Red Hat Enterprise Linux Software Collections"
```

- Use the pool identifiers located in the previous step to attach the **Red Hat Enterprise Linux 6 Server**, **Red Hat Enterprise Linux OpenStack Platform**, and **Red Hat Enterprise Linux Software Collections** entitlements:

```
# subscription-manager attach --pool=pool_id
```

- Enable the required channels:

```
# subscription-manager repos --enable=rhel-6-server-rpms
# subscription-manager repos --enable=rhel-6-server-openstack-foreman-rpms
# subscription-manager repos --enable=rhel-server-rhscl-6-rpms
# subscription-manager repos --enable=rhel-6-server-rh-common-rpms
```

- Install the *katello-agent* package:

```
# yum install katello-agent
```

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### 3.3.2. Preparing an Installation Medium using a Web Server

Use a web server to host a Red Hat Enterprise Linux 7 installation medium. This procedure must be performed on the machine where the installation medium is to be hosted.

- Go to <https://access.redhat.com>, and log in to the Red Hat Customer Portal using your customer account details.
- Click **Downloads** in the menu bar.
- Click **Red Hat Enterprise Linux** to access the product download page.
- Click **RHEL 7.0 Binary DVD**.
- Install the Apache web server on the machine on which to install the user interface:

```
# yum install httpd
```

- Start the **httpd** service, and ensure it starts on boot:

```
# service httpd start
# chkconfig httpd on
```

- In the root web server directory, create a directory in which to store the files for the installation medium:

```
# mkdir /var/www/html/[directory_name]
```

8. Create a temporary directory into which to mount the ISO file:

```
# mkdir /RHEL7
```

9. Mount the ISO file in the temporary directory:

```
# mount -t iso9660 -o loop rhel-server-7.0-x86_64-dvd.iso /RHEL7
```

10. Copy the contents of the temporary directory to the directory in which to store the files for the installation medium:

```
# cp -dpR /RHEL7 /var/www/html/.
```

11. Unmount the ISO file:

```
# umount /RHEL7
```

12. Remove the temporary directory in which you mounted the ISO file:

```
# rmdir /RHEL7
```

13. Create a new file at **/etc/httpd/conf.d/medium.conf** and add the following configuration to it:

```
Listen 8118
NameVirtualHost *:8118
<VirtualHost *:8118>
    DocumentRoot /var/www/html/
    ServerName www.example.com
    <Directory "/var/www/html/">
        Options All Indexes FollowSymLinks
        Order allow,deny
        Allow from all
    </Directory>
</VirtualHost>
```

This exposes an accessible location on the web server that contains your installation medium.

14. Restart your web server:

```
# systemctl restart httpd.service
```

15. Add a rule to your firewall configuration to allow access to port 8118:

```
# firewall-cmd --zone=public --add-port=8118/tcp --permanent
# firewall-cmd --reload
```

The installation medium is now available for the Red Hat Enterprise Linux OpenStack Platform Installer to access. Test access to the installation medium by navigating to <http://www.example.com:8118/RHEL7/>, which displays a listing of Red Hat Enterprise Linux 7 files and folders.

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### 3.3.3. Installing the User Interface

Run the **rhel-osp-installer** command to install the user interface and configure the core parameters that the installer uses to provision RHEL OpenStack Platform.

#### Note

The **rhel-osp-installer** command automatically configures the required SELinux permissions and adds the required firewall rules to **iptables** while preserving any existing firewall rules.

1. Install the *rhel-osp-installer* package:

```
# yum install rhel-osp-installer
```

2. Start the installation:

```
# rhel-osp-installer
```

3. Enter the number for the network interface that the installer will use to provision RHEL OpenStack Platform, and press **Enter**:

```
Please select NIC on which you want Foreman provisioning enabled:
1. eth1
2. eth0
?
```

4. Configure networking options:

- a. Enter the number for the configuration option to change, and press **Enter**.
- b. Enter a new value, and press **Enter**.
- c. When you have specified the preferred value for each configuration option, enter **1**, and press **Enter**.

Networking setup:

```
Network interface: 'eth1'
    IP address: 'XX.XX.XX.XX'
    Network mask: 'XX.XX.XX.XX'
    Network address: 'XX.XX.XX.XX'
    Host Gateway: 'XX.XX.XX.XX'
    DHCP range start: 'XX.XX.XX.XX'
    DHCP range end: 'XX.XX.XX.XX'
    DHCP Gateway: 'XX.XX.XX.XX'
    DNS forwarder: 'XX.XX.XX.XX'
```

```
Domain: 'mydomain.example.com'
Foreman URL: 'https://host.mydomain.example.com'
NTP sync host: '0.rhel.pool.ntp.org'
Timezone: 'America/New_York'
Configure networking on this machine: ✓
Configure firewall on this machine: ✓
```

The installer can configure the networking and firewall rules on this machine with the above configuration. Default values are populated from the this machine's existing networking configuration.

If you DO NOT want to configure networking please set 'Configure networking on this machine' to No before proceeding. Do this by selecting option 'Do not configure networking' from the list below.

How would you like to proceed?:

1. Proceed with the above values
2. Change Network interface
3. Change IP address
4. Change Network mask
5. Change Network address
6. Change Host Gateway
7. Change DHCP range start
8. Change DHCP range end
9. Change DHCP Gateway
10. Change DNS forwarder
11. Change Domain
12. Change Foreman URL
13. Change NTP sync host
14. Change Timezone
15. Do not configure networking
16. Do not configure firewall
17. Cancel Installation



### Important

The name of the domain must match that of the fully qualified domain name of the machine on which the user interface is being installed.



### Important

By default, the address of the machine on which the user interface is being installed is specified as the DHCP gateway, which is the gateway the installer configures on hosts it provisions. You must edit this value and specify the address of a machine that can perform this function.

## 5. Configure client authentication:

- a. Enter the number for the configuration option to change, and press **Enter**.
- b. Enter a new value, and press **Enter**.

- c. When you have specified either a SSH public key or a root password, enter **1**, and press **Enter**.

```
Configure client authentication
SSH public key: ''
Root password: *****
```

Please set a default root password for newly provisioned machines. If you choose not to set a password, it will be generated randomly. The password must be a minimum of 8 characters. You can also set a public ssh key which will be deployed to newly provisioned machines.

How would you like to proceed?:  
 1. Proceed with the above values  
 2. Change SSH public key  
 3. Change Root password  
 4. Toggle Root password visibility

## 6. Specify the details of an installation medium:

- a. Enter **1**, and press **Enter**.
- b. Enter the address of the installation medium, and press **Enter**.
- c. Enter **2**, and press **Enter**.

Now you should configure installation media which will be used for provisioning.

Note that if you don't configure it properly, host provisioning won't work until you configure installation media manually.

Enter RHEL repo path:  
 1. Set RHEL repo path (http or https URL): http://  
 2. Proceed with configuration  
 3. Skip this step (provisioning won't work)



### Note

The path you specify must be a full path that ends in the root directory containing the files and sub-directories for the installation medium. For example, **http://example.com/rhel7/** where **rhel7** is a directory that contains sub-directories such as **isolinux** and **LiveOS**, and **example.com** is the name of the machine where the installation medium is hosted.

## 7. Specify the details of a Subscription Manager account:

- a. Enter the number for the configuration option to change, and press **Enter**.
- b. Enter a new value, and press **Enter**.
- c. When you have specified the preferred value for each configuration key, enter **9**, and press **Enter**.

Enter your subscription manager credentials:

1. Subscription manager username:
2. Subscription manager password:
3. Comma separated repositories:                   rhel-7-server-openstack-5.0-rpms
4. Subscription manager pool (recommended):
5. Subscription manager proxy hostname:
6. Subscription manager proxy port:
7. Subscription manager proxy username:
8. Subscription manager proxy password:
9. Proceed with configuration
10. Skip this step (provisioning won't subscribe your machines)



### Note

The value for the Subscription Manager pool must be in the format of a Subscription Manager entitlement pool ID. Moreover, you can only specify a single entitlement pool ID. If you leave the value for this configuration item blank, the installer attempts to auto-attach the required entitlements on systems it provisions.

The user interface is installed, and the entries in the user interface required to provision RHEL OpenStack Platform are automatically generated based on the details you provided. After the installation is complete, the user name of and a randomly generated password for the default administrative user account are displayed. The address for accessing the user interface is also displayed.

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#### 3.3.4. Logging in to the User Interface for the First Time

When you install the user interface, a default administrative user account is created with the username **admin** and a randomly generated password. The first time you log in to the user interface, you must use this account. Moreover, it is strongly recommended that you immediately change the password for this account to secure access to the user interface.



### Note

If you do not have a copy of the randomly generated password, you can retrieve it by running the following command:

```
# grep admin_password /etc/foreman/rhel-osp-installer.answers.yaml
```

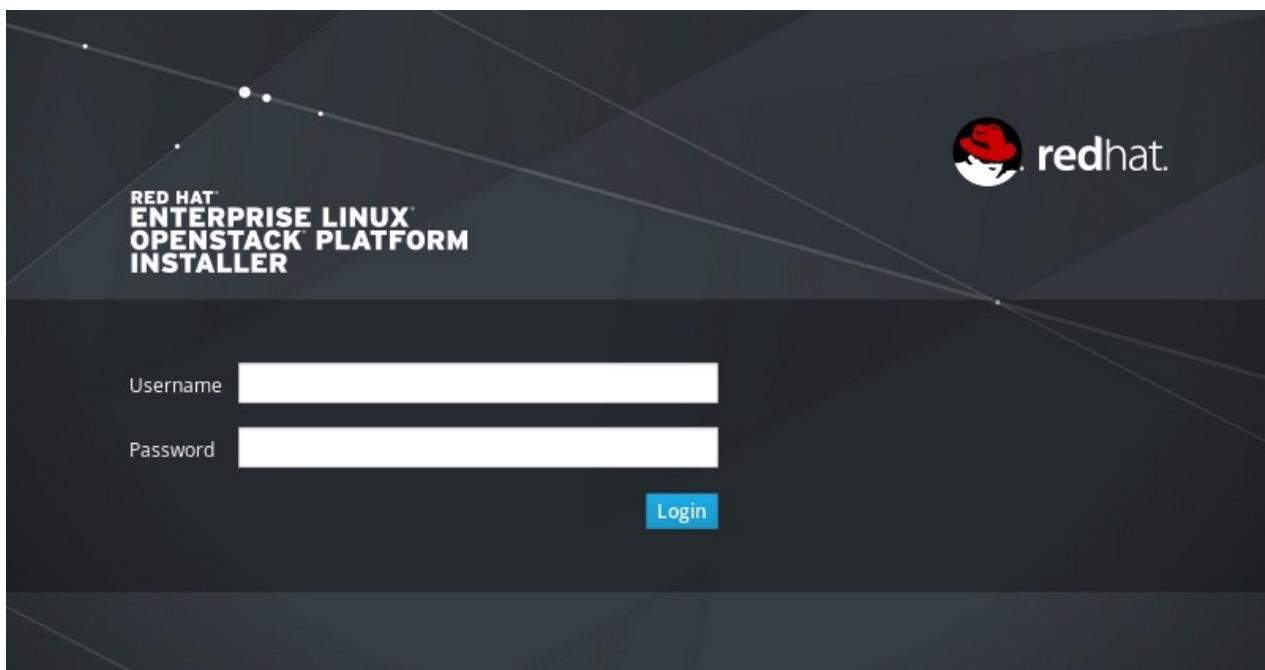
1. In a web browser, navigate to the URL provided once installation of the user interface is complete. By default, this URL is the fully qualified domain name of the machine on which the user interface is installed. For example, <https://myhost.example.com/>.



## Important

The first time that you connect to user interface, you are prompted to trust the certificate being used to secure communications between your browser and the web server. You must accept this certificate.

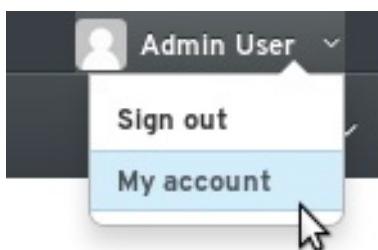
2. Enter **admin** in the **Username** field and the randomly generated password in the **Password** field.



**Figure 4. The Red Hat Enterprise Linux OpenStack Platform installer login screen**

3. Click **Login**.

4. In the user interface, click **Admin User** → **My account** in the upper right of the title bar to open the **Edit User** window.



**Figure 5. Accessing account settings**

5. Enter a new password in the **Password** field and again in the **Verify** field.
6. Click **Submit**.

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## 3.4. Adding Hosts

A host is a physical machine that acts as a node in a RHEL OpenStack Platform environment. To provision a basic RHEL OpenStack Platform environment, you must add two hosts to the user interface: one to act as a controller, and one to act as a Compute node.

### 3.4.1. Adding a Host via Discovery

Add a host to the user interface via the discovery function. This procedure assumes that the host is connected to the private network on which the installer provides the DHCP service.

1. Start the host, and select the network as the boot device to start the host using the PXE service that the installer provides.
2. Select **discovery** from the PXE boot options menu. The host starts into the **Foreman Discovery** screen and is automatically registered in the user interface.



**Figure 6. The Foreman Discovery Screen**

3. Log in to the user interface, and confirm that the host has been registered:
  - a. Click **Hosts** → **Discovered hosts** to open the **Discovered hosts** page.
  - b. Click the name of the newly registered host to open the details page for the host, and review the details.

The screenshot shows the 'RED HAT® ENTERPRISE LINUX® OPENSTACK® PLATFORM INSTALLER' interface. At the top, there's a navigation bar with tabs: 'Monitor', 'Hosts', 'Configure', 'Infrastructure', 'OpenStack Installer', and 'Administrator'. On the right side of the header, it says 'Admin User' and has a 'Logout' button. Below the header, the main content area displays the message 'Discovered host: mac123456789012'. At the bottom right of this area are three buttons: 'Provision' (blue), 'Refresh facts' (grey), and 'Delete' (grey). Underneath this, a section titled 'Facts discovered on this host' contains a table with the following data:

Fact	Value
architecture	x86_64
discovery_bootif	00:1A:4A:AE:A6:01
discovery_version	0.5.9999
domain	sampledomain
facterversion	1.6.6
fqdn	myhost.sampledomain
hardwareisa	x86_64

**Figure 7. The Discovered Host Details Page**

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## 3.5. Provisioning Red Hat Enterprise Linux OpenStack Platform

The installer provisions Red Hat Enterprise Linux OpenStack Platform using deployments. A deployment is a collection of settings that defines the hosts on which services are to be provisioned, options such as whether to use Neutron networking or Nova networking as the networking back end, and key parameters for several of the services to be provisioned.

### Note

This guide currently outlines only how to use Nova networking as the networking back end. Nova networking is a service integrated into the Compute node itself that manages both private and public networking access for virtual machines in the environment.

A key consideration when you create a new deployment is the volume driver for the Block Storage (Cinder) service:

### Volume Drivers

A volume driver is the storage back end that the Block Storage service uses to provide block storage to Compute nodes in a RHEL OpenStack Platform environment. The default implementation is to use LVM, but you can also choose from NFS storage, Ceph storage, or EqualLogic storage. For more information on each of the volume drivers and how to configure the options available to each volume driver, see "Volume Drivers" in the [Configuration Reference Guide](#).

#### 3.5.1. Creating a Deployment

Create a deployment for provisioning a RHEL OpenStack Platform environment.

1. Click **OpenStack Installer** → **New deployment**.

## 2. Configure deployment settings:

New OpenStack Deployment

**1 Deployment Settings**   **2 Network Configuration**   **3 Services Overview**   **4 Services Configuration**

**Name \*** My\_Deployment

**Description**

**High Availability \***  Controller / Compute  
  High Availability Controllers / Compute

**Networking \***  Neutron Networking  
  Nova Network

**Messaging Provider \***  RabbitMQ  
  Qpid

**Platform \***  Red Hat Enterprise Linux OpenStack Platform 5 with RHEL 7

**Service Password \***  Generate random password for each service  
  Use single password for all services

**Custom repos**

If you need to add custom repositories on provisioned hosts you can specify base urls here, one per line. These repositories will have highest priority (50)

**Cancel** **Next >**

**Figure 8. The Deployment Settings step**

- a. Enter a name for the deployment in the **Name** field.
- b. Enter a description in the **Description** field.
- c. Select **Controller / Compute** in the **High Availability** section.
- d. Select **Nova Network** in the **Networking** section.
- e. Select **RabbitMQ** as the message broker in the **Messaging Provider** section.

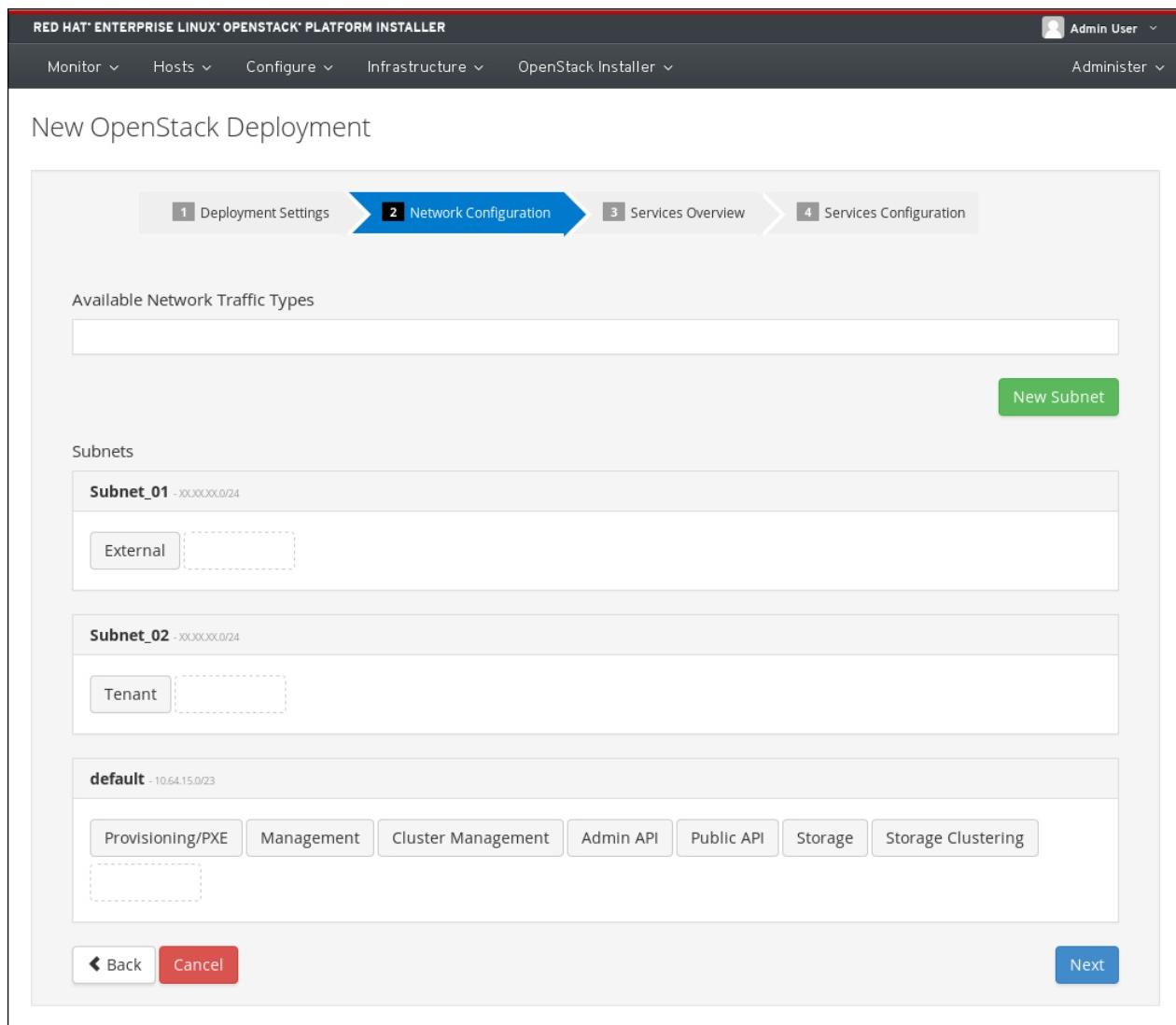
### Note

As of Red Hat Enterprise Linux OpenStack Platform 5, RabbitMQ replaces QPId as the default (and recommended) message broker.

- f. Ensure **Red Hat Enterprise Linux OpenStack Platform 5 with RHEL 7** is selected in the **Platform** section.

- g. Select **Generate random password for each service** in the **Service Password** section to generate a random password for each service.
- h. Leave the **Custom repos** text area blank.
- i. Click **Next**.

3. Configure network traffic:



**Figure 9. The Network Configuration step**

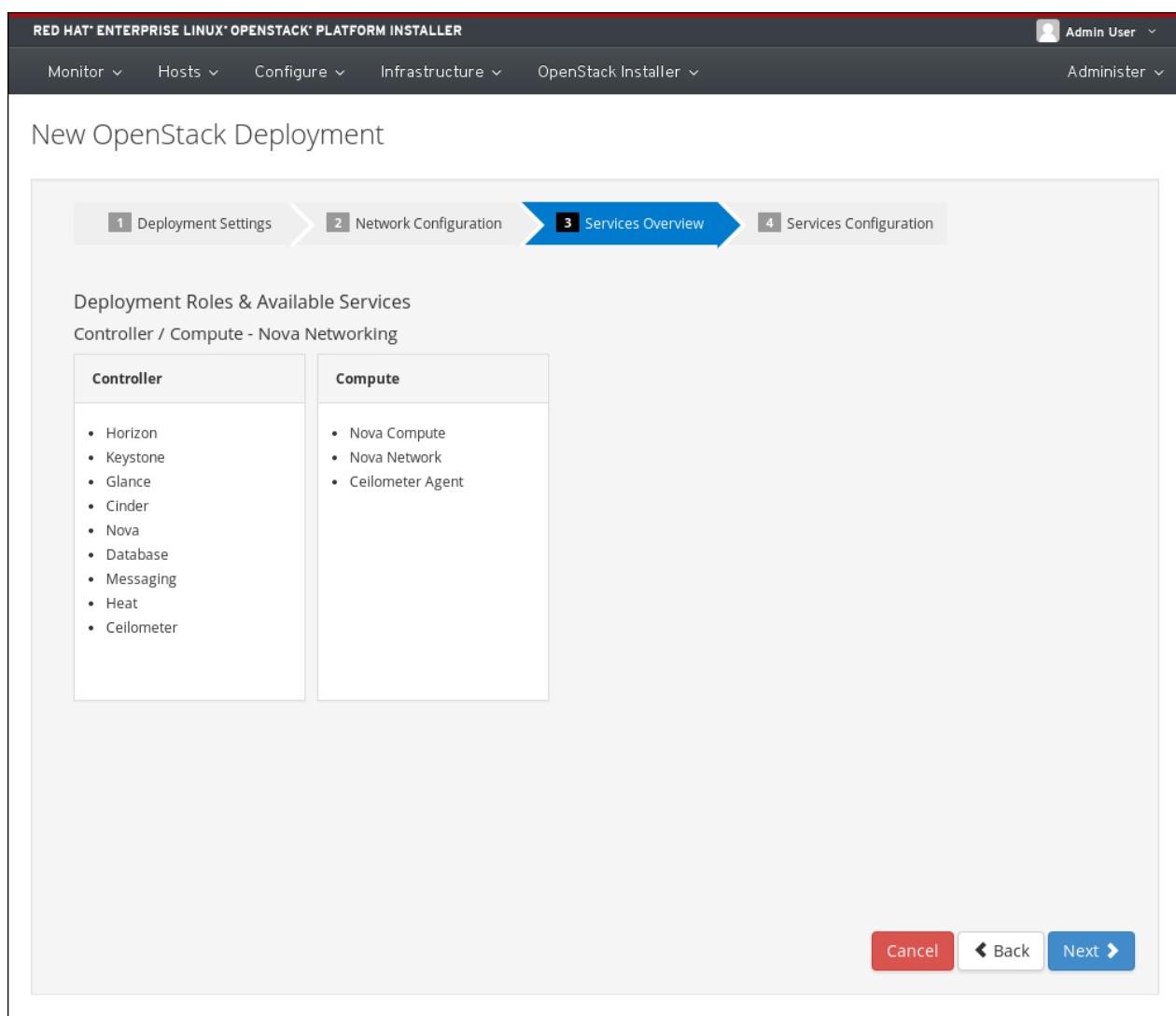
- a. Drag and drop the available network traffic types into the section for a subnet.
- b. Create new subnets if you require a new subnet to which to assign a network traffic type:
  - a. Click **New Subnet**.
  - b. Enter a name to represent the subnet in the user interface in the **Name** field.
  - c. Select **External DHCP** or **No existing DHCP** from the **DHCP server** list. If you select **No Existing DHCP** and the subnet is to carry the **Public API** network traffic type, you must enter the address of a machine that can act as a gateway in the **Gateway** field. If you select **No existing DHCP**, you can also specify the **IP Range Start** and the **IP Range End**.

- d. Enter the network address in the **Network Address** field. This address must be in CIDR notation. For example, **XX.XX.XX.0/24**.
- e. Optionally, enter a VLAN ID for the subnet in the **VLAN** field.
- f. Click **Create Subnet**.
- c. Click **Next**.

### Note

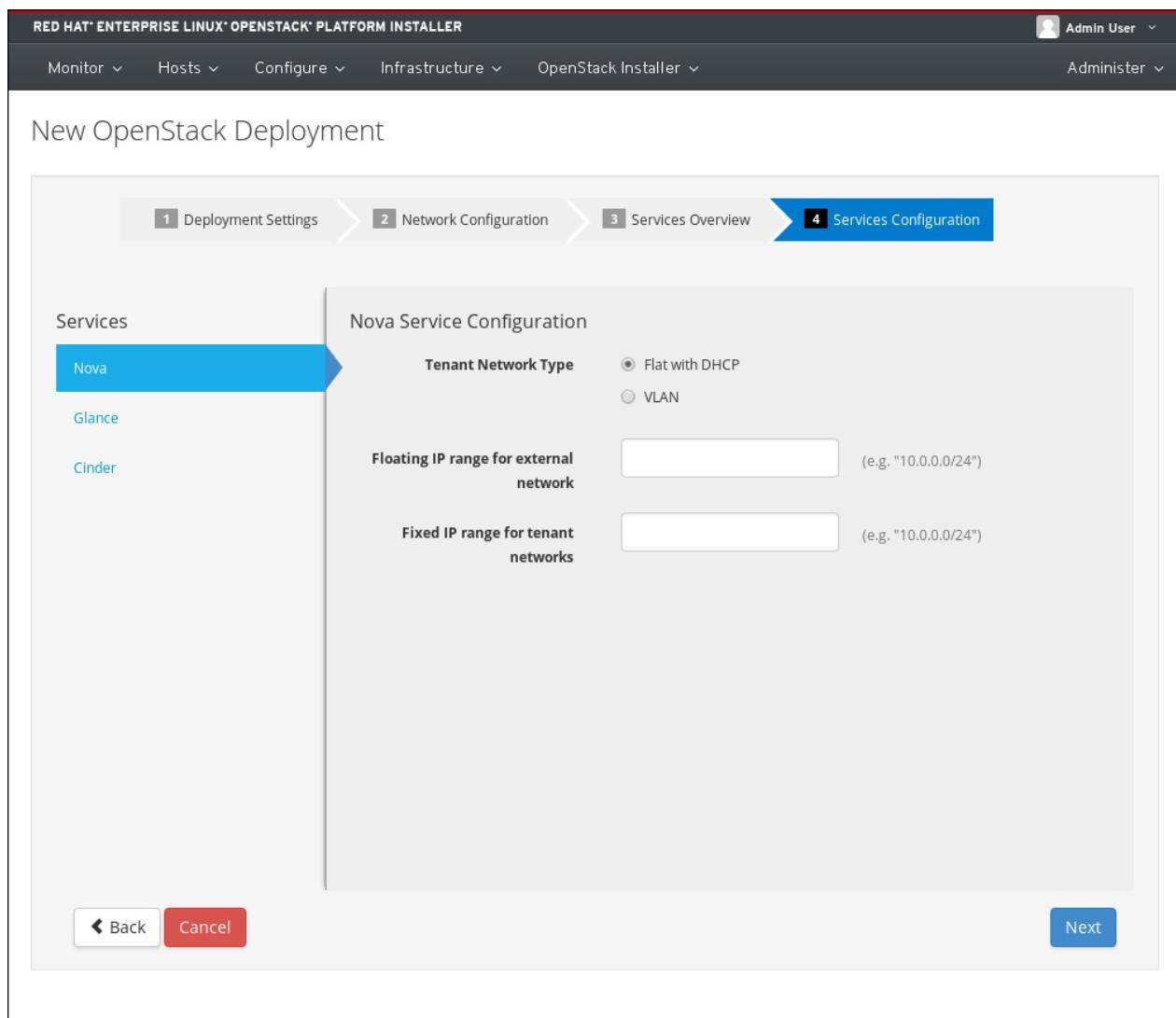
By default, all network traffic types except **External** is assigned to the default subnet. Because the **External** network traffic type is required and cannot be assigned to the same subnet as other network traffic types, you must create a dedicated subnet for this network traffic type. You can then drag and drop network traffic types to subnets as required, or to the **Available Network Traffic Types** section to disable optional network traffic types.

4. In the **Services Overview** step, review the list of services to be provisioned, and click **Next**.



**Figure 10. The Services Configuration step**

## 5. Configure service options:



**Figure 11. The Services Configuration step**

### a. Nova

- ✿ **Tenant Network Type:** Select the type of network used for tenant networks. You can choose from **Flat with DHCP**, or **VLAN**. If you choose **VLAN**, you must also specify the tenant VLAN range.
- ✿ **Floating IP range for external network:** Enter the range of IP addresses to be used for external networks. Ranges must be entered using CIDR notation. For example, **XX.XX.XX.0/24**.
- ✿ **Fixed IP range for tenant networks:** Enter the range of IP addresses to be used for tenant networks. Ranges must be entered using CIDR notation. For example, **XX.XX.XX.0/24**.

### b. Glance

- ✿ **Choose Driver Backend:** Select the driver to use for back-end storage of images. Select **Local File** for the local file system.

### c. Cinder

- ❖ **Choose Driver Backend:** Select **LVM** for the volume driver to use for back-end storage.

6. Click **Next**.

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### 3.5.2. Assigning a Host to a Deployment Role

After you have created the deployment, you must assign the hosts you added to the user interface to roles in that deployment. You must assign one host to the **Controller (Nova)** role, and one host to the **Compute (Nova)** role.

1. Click **OpenStack Installer** → **Deployments**.
2. Click the name of the deployment to which to assign hosts.

Assigned Hosts					<a href="#">Unassign Hosts</a>
<input type="checkbox"/>	Name	NICs	Storage	Deploying?	IP Address
<input type="checkbox"/>	host001.example.com	eth0	-	-	XX.XX.XX.XX

**Figure 12. The deployment details page**

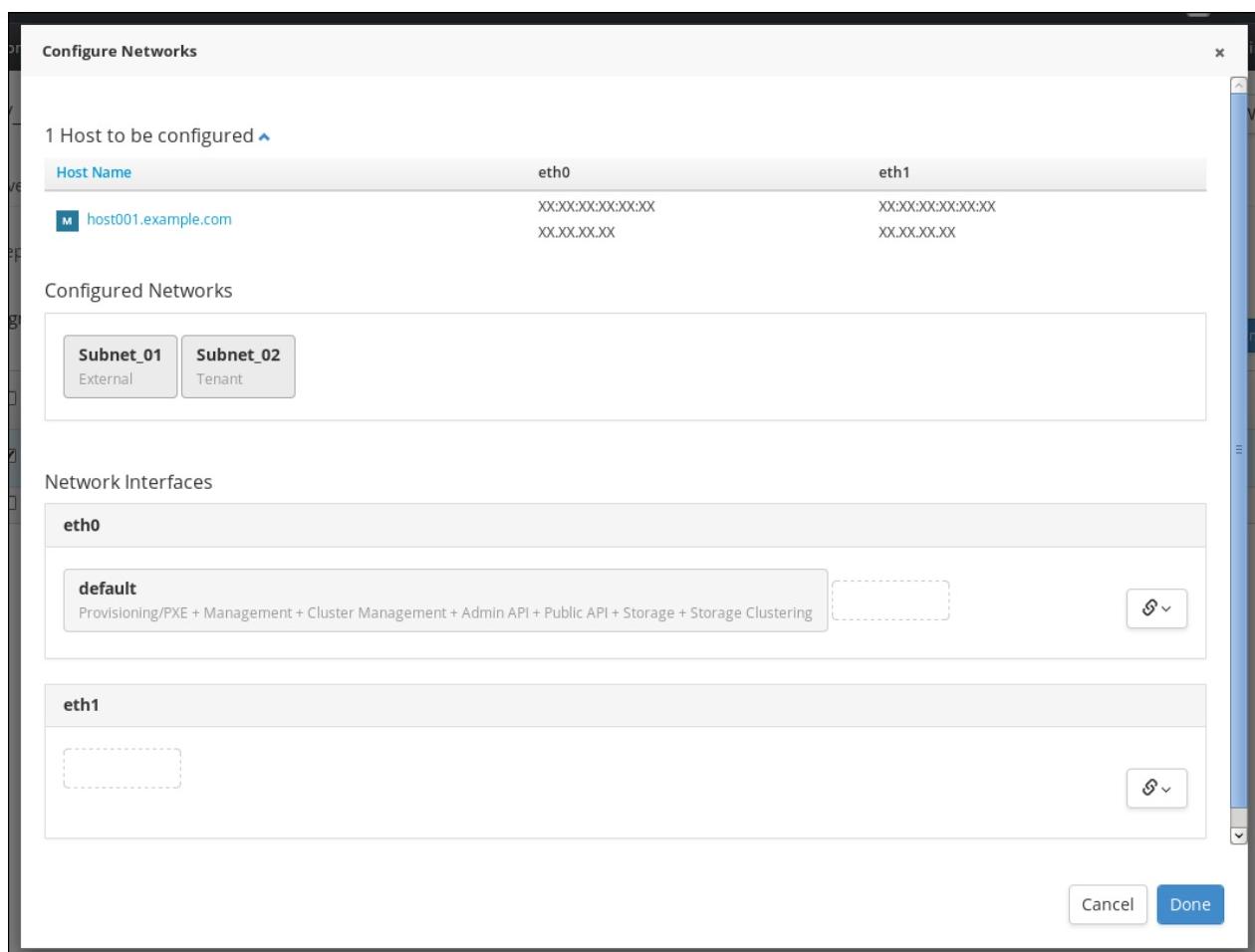
3. In the **Deployment Roles** section, click **+** for a deployment role.
4. Select the check box for a host in the **Free Hosts** section.
5. Click **Assign Hosts**.

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### 3.5.3. Configuring Host Networking

After you have assigned hosts to a deployment, you must configure the subnets assigned to the network interfaces on the hosts before you can provision the RHEL OpenStack Platform environment. The following procedure must be performed on each host in your deployment.

1. From the deployment details page, click the **Hosts** tab.
2. Click the **Assigned** sub-tab.
3. Select the check box for a host and click **Configure Networks**.
4. Drag and drop subnets between the sections for network interfaces to change the network traffic carried by those interfaces.



**Figure 13. The Configure Networks Screen**

5. Click **Done**.

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### 3.5.4. Provisioning Red Hat Enterprise Linux OpenStack Platform

Use a deployment to provision RHEL OpenStack Platform on one or more hosts.

1. Click **OpenStack Installer** → **Deployments**.
2. Click the name of the deployment to provision.

	Name	NICs	Storage	Deploying?	IP Address
<input type="checkbox"/>	host001.example.com	eth0		-	XX.XX.XX

**Figure 14.** The deployment details page

- Click **Deploy** to open the deployment confirmation screen.

**Figure 15.** The deployment confirmation screen

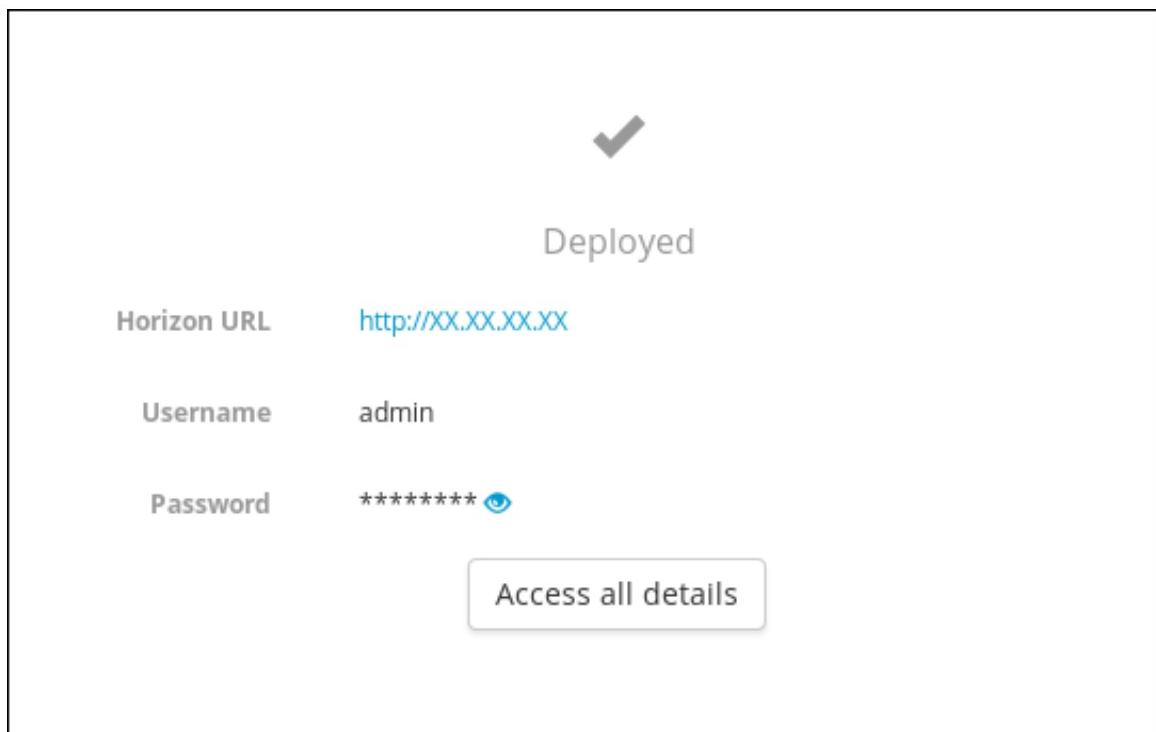
- Click **Deploy**.

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### 3.5.5. Retrieving Service Details

After you have provisioned your RHEL OpenStack Platform environment, you must retrieve the password for the messaging broker and the location and credentials of the Dashboard service for your RHEL OpenStack Platform environment. These details are required when you later log in to the Dashboard and when you add the environment to the Red Hat CloudForms Management Engine.

1. Click **OpenStack Installer** → **Deployments**.
2. Click the name of a deployment you have provisioned.
3. Retrieve the details of the Dashboard service:
  - a. Note the value of the **Horizon URL** field and **Username** field.
  - b. Click the disclosure button next to the row of asterisks in the **Password** field, and note the password.



**Figure 16. The service details page**

4. Retrieve the password for the messaging broker:
  - a. Click the **Access all details** button.
  - b. Note the value of the **Amqp** field.

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## 4. Installing Red Hat CloudForms

Red Hat CloudForms provides a centralized management console for large and distributed virtualized deployments. It extends Red Hat Enterprise Virtualization and Red Hat Enterprise Linux OpenStack Platform management capabilities by adding performance monitoring, discovery, self-service provisioning, policy-based compliance, charge-back, and greater automation capability.

Red Hat CloudForms is comprised of a single component, the CloudForms Management Engine

appliance. After downloading the appliance as a virtual machine image template from the Red Hat Customer Portal, upload the appliance to a RHEL OpenStack Platform environment. After a few appliance configuration steps, you are ready to manage your hybrid cloud environment using the CloudForms web interface.

## 4.1. Requirements for Red Hat CloudForms

To use CloudForms Management Engine, the following requirements must be met:

- » One of the following web browsers:
  - Mozilla Firefox for versions supported under Mozilla's Extended Support Release (ESR) [1]
  - Internet Explorer 8 or higher
  - Google Chrome for Business
- » A monitor with minimum resolution of 1280x1024.
- » Adobe Flash Player 9 or above. At the time of publication, you can access it at <http://www.adobe.com/products/flashplayer/>.

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## 4.2. Obtaining the CloudForms Management Engine Appliance

1. Go to <https://access.redhat.com>, and log in to the Red Hat Customer Portal using your customer account details.
2. Click **Downloads** in the menu bar.
3. Click **A-Z** to sort the product downloads alphabetically.
4. Click **Red Hat CloudForms** to access the product download page.
5. Click the **CFME OpenStack Virtual Appliance** download link.

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## 4.3. Logging in to the Dashboard for the First Time

After you have obtained the appliance image, you must log in to the Dashboard for your RHEL OpenStack Platform environment for the first time to upload the appliance and continue the installation process.

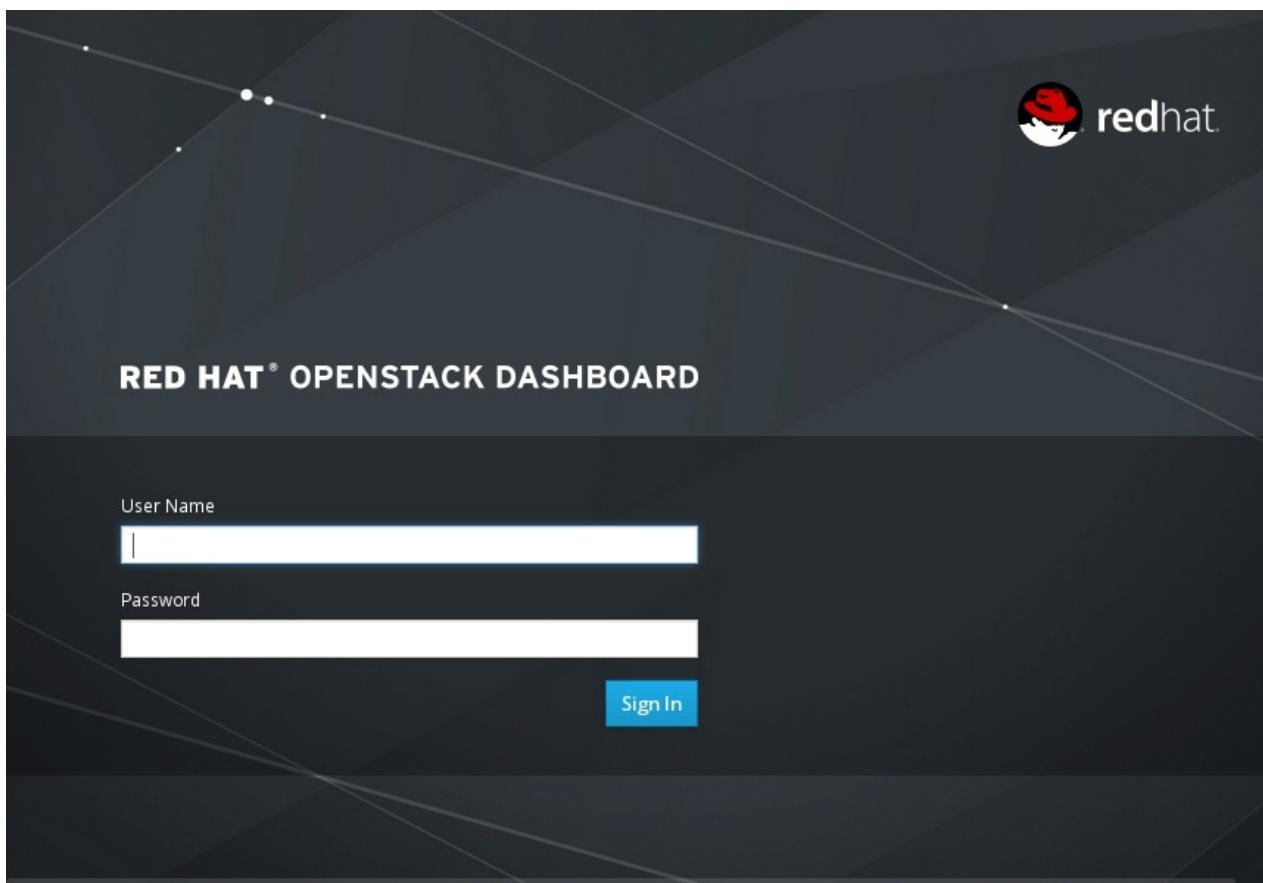


### Important

To log in to the Dashboard, you require the IP address and credentials you retrieved earlier before provisioning the RHEL OpenStack Platform environment.

1. In a web browser, navigate to the address of the Dashboard. By default, this URL is the IP address of the machine on which the Dashboard is installed followed by **/dashboard**. For example, **http://XX.XX.XX.XX/dashboard**.

2. Enter **admin** in the **User Name** text field and the password for the default administrative user in the **Password** text field.



**Figure 17. The Dashboard login screen**

3. Click **Sign In**.

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#### 4.4. Uploading the Appliance on Red Hat Enterprise Linux OpenStack Platform

1. From the OpenStack Dashboard, in the **Project** tab, click **Images** under the **Compute** menu.
2. Click **Create Image**.
3. Enter a name for the image.
4. Include the location URL of the image in the **Image Location** field, or save the image file to your machine and browse to this location in the **Image File** field. For example, the image file name is in the format **cfme-rhos-5.3-26.x86\_64.qcow2**
5. Select the correct type from the **Format** list (for example, **QCOW2**).
6. In the **Architecture** field, specify the architecture. For example, i386 for a 32-bit architecture or x86-64 for a 64-bit architecture.
7. Enter **45** in the **Minimum Disk (GB)** and **6144** in the **Minimum RAM (MB)** fields.

8. Select **Public** to make the appliance available to all users.
9. Select **Protected** to protect the image from being accidentally deleted.
10. Click **Create Image** to place the appliance image in the queue to be uploaded. After the appliance image is available, the **Status** of the appliance image changes from **Queued** to **Active**.

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## 4.5. Adding a Rule to a Security Group

Security groups specify what IP traffic is allowed to reach an instance on its public IP address. Security group rules are processed before network traffic reaches firewall rules defined within the guest itself.

 **Note**

In the default configuration, the default security group accepts all connections from the default source; all instances within the default group can talk to each other on any port.

1. From the OpenStack Dashboard, in the **Project** tab, click **Access & Security** under the **Compute** menu.
2. In **Security Groups**, click **Manage Rules** on the row for the **default** security group.

Edit Security Group Rules: default

Logged in as: demo    [Settings](#)    [Help](#)    [Sign Out](#)

Security Group Rules						
	Direction	Ether Type	IP Protocol	Port Range	Remote	Actions
<input type="checkbox"/>	Ingress	IPv6	Any	-	default	<a href="#">Delete Rule</a>
<input type="checkbox"/>	Egress	IPv4	Any	-	0.0.0.0/0 (CIDR)	<a href="#">Delete Rule</a>
<input type="checkbox"/>	Egress	IPv6	Any	-	::/0 (CIDR)	<a href="#">Delete Rule</a>
<input type="checkbox"/>	Ingress	IPv4	Any	-	default	<a href="#">Delete Rule</a>

Displaying 4 items

**Figure 18. Edit Security Group Rules: default Dialog**

3. Click **Add Rule**.

**Description:**

Rules define which traffic is allowed to instances assigned to the security group. A security group rule consists of three main parts:

**Rule:** You can specify the desired rule template or use custom rules, the options are Custom TCP Rule, Custom UDP Rule, or Custom ICMP Rule.

**Open Port/Port Range:** For TCP and UDP rules you may choose to open either a single port or a range of ports. Selecting the "Port Range" option will provide you with space to provide both the starting and ending ports for the range. For ICMP rules you instead specify an ICMP type and code in the spaces provided.

**Remote:** You must specify the source of the traffic to be allowed via this rule. You may do so either in the form of an IP address block (CIDR) or via a source group (Security Group). Selecting a security group as the source will allow any other instance in that security group access to any other instance via this rule.

**Figure 19. Add Rule Dialog**

4. Configure the rule.

- a. Select **Custom TCP Rule** from the **Rule** list.
- b. Select **Ingress** from the **Direction** list.
- c. Select **Port** from the **Open Port** list.
- d. Specify **443** in the **Port** field.
- e. Select **CIDR** from the **Remote** list.
- f. Specify **0 . 0 . 0 . 0 /0** in the **CIDR** field.

5. Click **Add**.

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## 4.6. Creating a Custom Flavor for CloudForms Management Engine

A flavor is a resource allocation profile that specifies, for example, how many virtual CPUs and how much RAM can be allocated to an instance. You can, for example, run CloudForms Management Engine on a RHEL OpenStack Platform m1.large flavor, which specifies a virtual machine with 4 cores, 8GB RAM, and 80GB disk space. This procedure explains how to create a custom flavor to suit the specific requirements of the CloudForms Management Engine appliance.

1. From the OpenStack Dashboard, in the **Admin** tab, click **Flavors** under the **System Panel** menu.
2. Click **Create Flavor**.
3. Configure the settings to define a flavor that meets CloudForms Management Engine system requirements:
  - a. Enter a name for the flavor.
  - b. Enter the following settings:
    - ✿ **VCPUs: 4**
    - ✿ **RAM MB: 6144**
    - ✿ **Root Disk GB: 45**
    - ✿ **Ephemeral Disk GB: 0**
    - ✿ **Swap Disk MB: 0**
4. Click **Create Flavor**.

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## 4.7. Launching the CloudForms Management Engine Instance

1. From the OpenStack Dashboard, in the **Project** tab, click **Instances** under the **Compute** menu.
2. Click **Launch Instance**.
3. Enter a name for the instance.
4. Select the custom flavor for your instance. The flavor selection determines the computing resources available to your instance. The resources used by the flavor are displayed in the **Flavor Details** pane.
5. Enter **1** in the **Instance Count** field.
6. Select the **Boot from image** boot option from the **Instance Boot Source** list. A new field for **Image Name** will be displayed. Select the image from the drop-down list.
7. Click **Networking** then select a network for the instance by clicking the **+** (plus) button for the network from **Available Networks**.
8. Click **Launch**.

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## 4.8. Adding a Floating IP Address

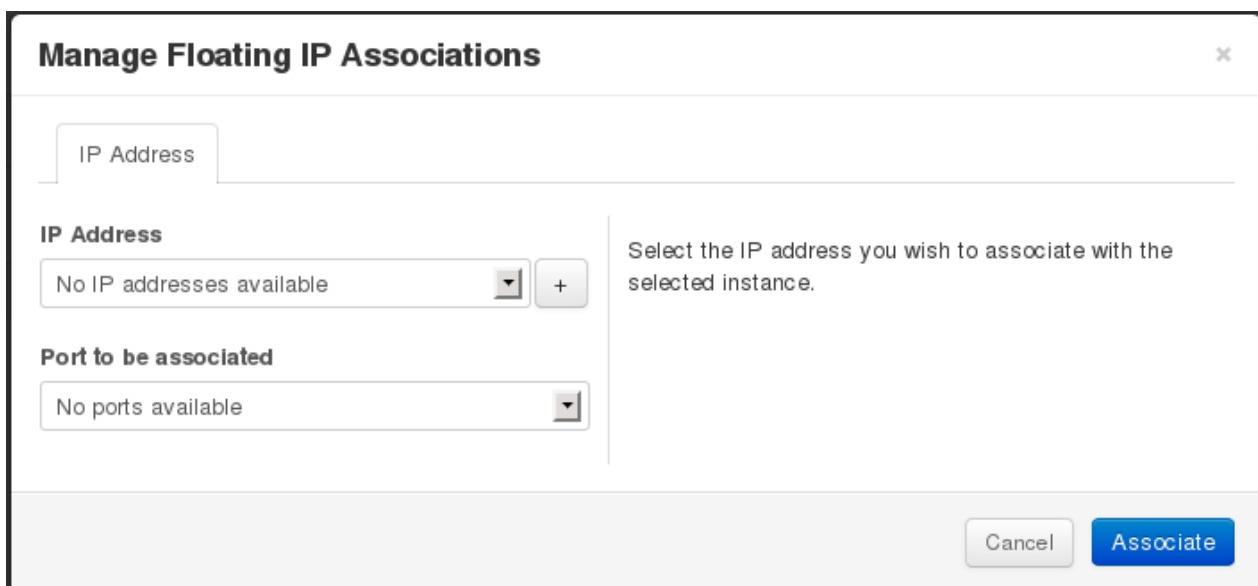
When you create an instance, Red Hat Enterprise Linux OpenStack Platform automatically assigns it a fixed IP address in the network to which the instance belongs. This IP address is permanently associated with the instance until the instance is terminated.

In addition to the fixed address, you can also assign a floating IP address to an instance. Unlike fixed IP addresses, you can modify floating IP addresses associations at any time, regardless of the state of the instances involved.

- At the command-line on your RHEL OpenStack Platform host, create a pool of floating IP addresses using the **nova-manage floating create** command. Replace *IP\_BLOCK* with the desired block of IP addresses expressed in CIDR (Classless Inter-Domain Routing) notation (for example 192.168.0.0/16).

```
$ nova-manage floating create IP_BLOCK
```

- In the OpenStack Dashboard, under the **Project** tab, click **Access & Security** under the **Compute** menu.
- In the **Floating IPs** tab, click **Allocate IP to Project**. The allocated IP address appears in the **Floating IPs** table.
- Locate the newly allocated IP address in the **Floating IPs** table. On the same row, click **Associate** to assign the IP address to a specific instance.



**Figure 20. Manage Floating IP Addresses Dialog**

- Select an instance with which to associate the floating **IP Address**.
- Click **Associate** to associate the IP address with the selected instance.

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## 4.9. Creating a Volume

Create a volume on which to host the database for the appliance.

- From the OpenStack Dashboard, click **Project** in the title bar.
- Click **Volumes**.
- Click **Create Volume**.

**Create Volume**

**Volume Name:** \*  
DB\_Disk

**Description:**  
Internal database storage

**Type:**

**Size (GB):** \*  
20

**Volume Source:**  
No source, empty volume

**Availability Zone**  
Any Availability Zone

**Description:**  
Volumes are block devices that can be attached to instances.

**Volume Limits**

Total Gigabytes (0 GB)	1,000 GB Available
Number of Volumes (0)	10 Available

**Cancel** **Create Volume**

The screenshot shows the 'Create Volume' dialog box. On the left, there are several input fields: 'Volume Name:' with 'DB\_Disk', 'Description:' with 'Internal database storage', 'Type:' (empty), 'Size (GB):' with '20', 'Volume Source:' with 'No source, empty volume', and 'Availability Zone' with 'Any Availability Zone'. On the right, there's a descriptive text block: 'Volumes are block devices that can be attached to instances.' Below it is a section titled 'Volume Limits' with two progress bars: one for 'Total Gigabytes (0 GB)' at 1,000 GB Available, and another for 'Number of Volumes (0)' at 10 Available. At the bottom right are 'Cancel' and 'Create Volume' buttons.

**Figure 21. The Create Volume window**

4. Specify a name for the volume in the **Volume Name** field.
5. Enter a description of the volume in the **Description** field.
6. Leave the **Type** field blank.
7. Specify **20** in the **Size (GB)** field.
8. Select **No source, empty volume** from the **Volume Source** list.
9. Select **Any Availability Zone** from the **Availability Zone** list.
10. Click **Create Volume**.

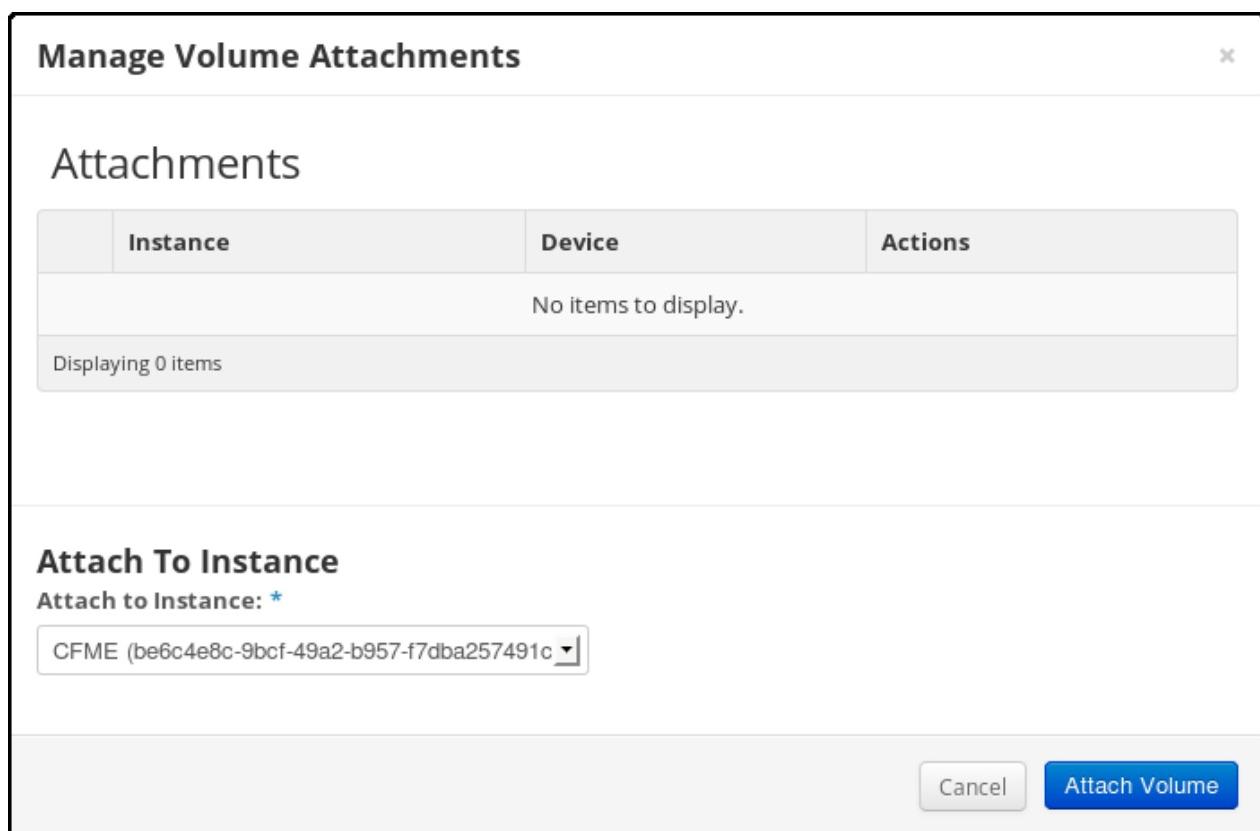
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## 4.10. Attaching the Volume to the Appliance Instance

After you have created the volume, you must attach it to the appliance instance. Attaching a volume to an instance makes that volume available to the instance as a virtual disk that can be used for storage.

1. From the OpenStack Dashboard, click **Project** in the title bar.
2. Click **Volumes**.

3. Click **More** → **Edit Attachments** in the **Actions** column for the volume.



**Figure 22. The Manage Volume Attachments window**

4. Select the instance for the appliance from the **Attach to Instance** list.
5. Click **Attach Volume**.
6. Note the value of the **Attached To** column for the volume. This is the device path that the instance uses to access the volume, and is required when you specify the location at which to configure the appliance database.

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## 4.11. Accessing the Console for the Appliance Instance

After you have attached the volume to the appliance, you must access the console for the appliance to configure the database. A console is a graphical user interface that allows you to interact with a virtual machine in a similar way as a physical machine.

1. Click **Instances**.
2. Click the name of the appliance instance.
3. Click the **Console** tab.
4. Click the gray status bar at the top of the console to ensure keyboard input is redirected to the console.

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## 4.12. Configuring an Internal Database

CloudForms Management Engine uses a database to store information about the cloud environment it manages. You must configure a database for the appliance before you can use it to administer your cloud infrastructure.

1. Log in to the appliance using the user name **admin** and the password **smartvm**.
2. Press **Enter** to change to the configuration menu.
3. Select **8) Configure Database** from the menu.
4. Choose **1) Create key** to create an encryption key.
5. Choose **1) Internal** for the database location.
6. Choose a disk for the database. For example:

1) /dev/vdb: 20480

Choose disk:

Enter **1** to choose **/dev/vdb** for the database location.

7. When prompted, enter a three digit region ID to create a region. As your deployment grows, you can add more regions in the future to manage multiple appliances.



### Warning

Creating a new region destroys any existing data on the selected disk.

8. Confirm the configuration when prompted.

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## 5. Adding Red Hat Enterprise Linux OpenStack Providers to Red Hat CloudForms

Adding a Red Hat Enterprise Linux OpenStack Platform provider to Red Hat CloudForms establishes a connection between the two environments, enabling the appliance to manage the hybrid cloud environment.

### 5.1. Adding a Red Hat Enterprise Linux OpenStack Platform Provider

1. In a web browser, navigate to the URL of the CloudForms Management Engine console. By default, this URL is the IP address of the machine on which the appliance is installed. The web console may take several minutes to become available after installation of the appliance.
2. Enter **admin** in the **Username** text field, and **smartvm** in the **Password** text field.
3. Click **Log In**.
4. Navigate to **Clouds → Providers**.
5. Click **Configuration**, then click **Add a New Cloud Provider**.

6. Enter a **Name** for the provider.
7. From the **Type** list select **OpenStack**.
8. Enter the **Host Name** of the provider.
9. Enter the **IP Address** of the provider.
10. Enter the **API Port** of your Keystone service. Use the default port, **5000**.
11. Select the appropriate **Zone** if you have more than one available.
12. If QPID credentials were changed during the OpenStack provider install, use the **AMQP** subtab to provide credentials required for the Advanced Message Queuing Protocol service on your OpenStack Nova component.
13. Fill out the **Credentials** by typing in a **User ID**, **Password**, and a verification of this password (**Verify Password**). Use the administrative User ID and Password for your login credentials. To retrieve the credentials that were provided at the time of OpenStack deployment, see, [Section 3.5.5, “Retrieving Service Details”](#)



### Important

To enable discovery of OpenStack cloud providers, ensure that the **iptables** for the OpenStack host providing Keystone services allows port 5000 access to all hosts on the same network.

14. Click **Validate** to validate the credentials.

15. Click **Add**.

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## 6. Explore What's Next

Congratulations! You have now successfully deployed Red Hat Cloud Infrastructure by installing CloudForms Management Engine on your Red Hat Enterprise Linux OpenStack Platform environment.

Use CloudForms to perform a multitude of management tasks aggregating all information associated with your virtual infrastructure into a single, unified management console. For virtual environments, CloudForms provides monitoring and tracking, capacity management and planning, resource usage and optimization, virtual machine life cycle management, and policies to govern access and usage.

See the following links that describe some of the management tasks you can perform in your virtualized cloud environment:

- » [Adding a Provider](#)
- » [Provisioning Requests](#)
- » [Performing SmartState Analysis On Hosts](#)
- » [Viewing Capacity and Utilization Charts For a Virtual Machine](#)
- » [Usage, Chargeback, and Timelines](#)

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## A. Revision History

<b>Revision 5.0-11</b>	<b>Fri Jan 23 2015</b>	<b>Zac Dover</b>
<a href="#">BZ#1180001</a> - Updated the key steps required for installation.		
<b>Revision 5.0-10</b>	<b>Thu Dec 18 2014</b>	<b>Andrew Dahms</b>
Removed introductory sections that have now been formed into a standalone reference.		
<b>Revision 5.0-9</b>	<b>Tue Nov 11 2014</b>	<b>Andrew Dahms</b>
<a href="#">BZ#1161973</a> - Updated instructions for obtaining a Red Hat Enterprise Linux 7.0 ISO file.		
<b>Revision 5.0-8</b>	<b>Tue Nov 11 2014</b>	<b>Brian Moss</b>
<a href="#">BZ#1161972</a> - Updated instructions for obtaining the CloudForms Management Engine appliance.		
<b>Revision 5.0-7</b>	<b>Fri Nov 7 2014</b>	<b>Athene Chan</b>
<a href="#">BZ#1161426</a> - Updated the firewall rules for elasticsearch.		
<b>Revision 5.0-6</b>	<b>Thu Nov 6 2014</b>	<b>Andrew Dahms</b>
<a href="#">BZ#1160895</a> - Updated the minimum operating system requirements for the installer. <a href="#">BZ#1160894</a> - Updated the procedure for retrieving service details. <a href="#">BZ#1160893</a> - Added a procedure outlining how to configure host networking. <a href="#">BZ#1160892</a> - Updated the procedure for creating a deployment.		
<b>Revision 5.0-5</b>	<b>Fri Oct 31 2014</b>	<b>Andrew Dahms</b>
Final revision for publication.		
<b>Revision 5.0-4</b>	<b>Thu Oct 30 2014</b>	<b>Athene Chan</b>
<a href="#">BZ#1156049</a> - Added a procedure on synchronizing content in Red Hat Satellite Server. <a href="#">BZ#1156040</a> - Added a procedure on populating Red Hat Satellite Server with content. <a href="#">BZ#1156027</a> - Added a procedure on accessing the Red Hat Satellite Server user interface.		
<b>Revision 5.0-3</b>	<b>Thu Oct 30 2014</b>	<b>Lucy Bopf</b>
<a href="#">BZ#1156254</a> - Updated the section on synchronizing repositories, creating a synchronization plan, and applying a synchronization schedule for Red Hat Satellite. <a href="#">BZ#1156246</a> - Updated the section on enabling the required repositories for Red Hat Satellite. <a href="#">BZ#1156244</a> - Updated the section on setting up and uploading a manifest for Red Hat Satellite. <a href="#">BZ#1155836</a> - Updated the section on installing and configuring Red Hat Satellite. <a href="#">BZ#1155835</a> - Updated the section on subscribing to the required channels for Red Hat Satellite using subscription manager.		
<b>Revision 5.0-2</b>	<b>Wed Oct 29 2014</b>	<b>Andrew Dahms</b>
<a href="#">BZ#1154897</a> - Added an overview of Red Hat Satellite. <a href="#">BZ#1155832</a> - Added information on requirements for Red Hat Satellite. <a href="#">BZ#1156258</a> - Revised the content on subscribing to the required channels.		
<b>Revision 5.0-1</b>	<b>Tue Oct 21 2014</b>	<b>Brian Moss</b>
<a href="#">BZ#1153026</a> - Updated the procedure for configuring an internal database.		
<b>Revision 5.0-0</b>	<b>Wed Oct 15 2014</b>	<b>Andrew Dahms</b>
Initial creation for Red Hat Cloud Infrastructure 5.0.		

[1] <http://www.mozilla.org/en-US/firefox/organizations/faq/>